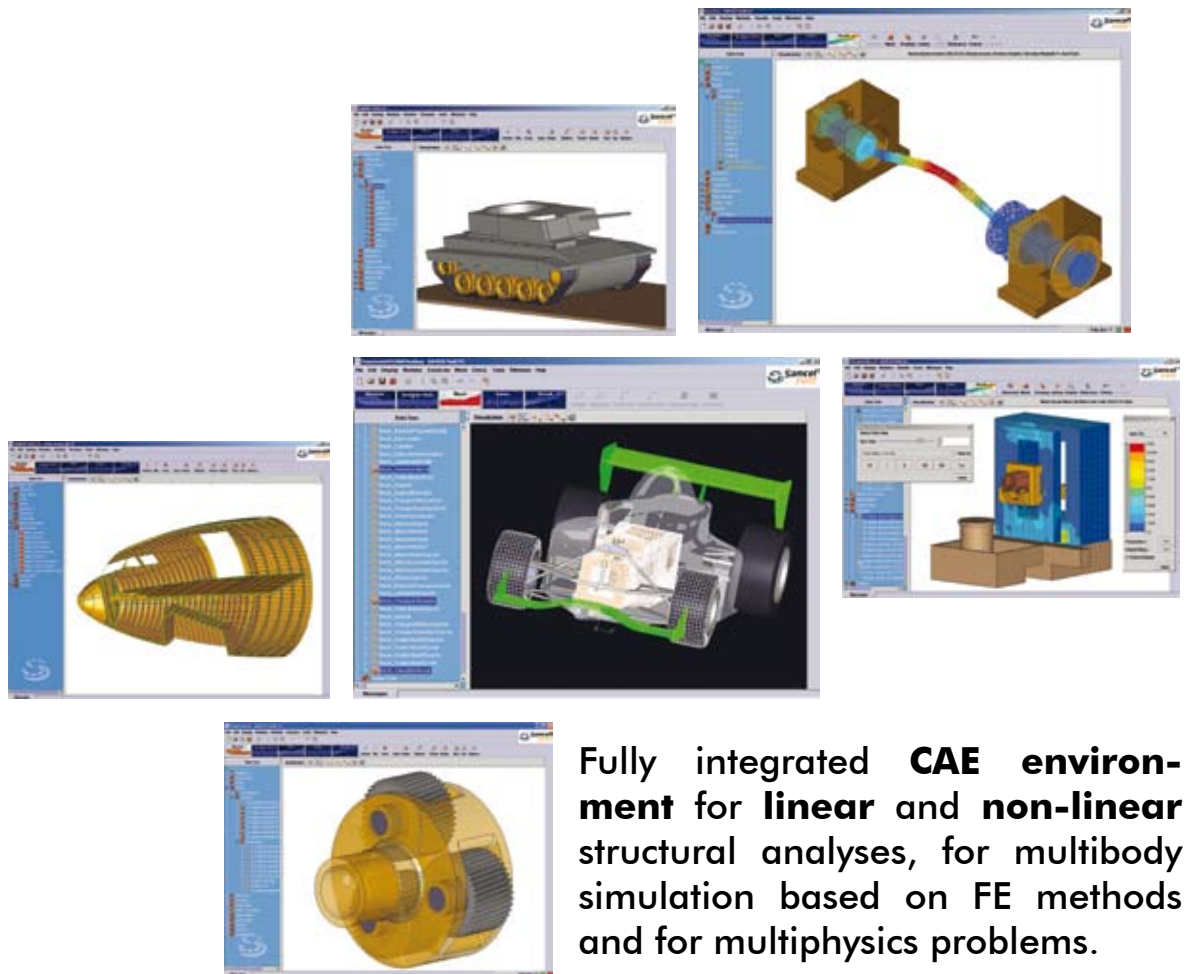


SAMCEF Field



Fully integrated **CAE environment** for **linear** and **non-linear** structural analyses, for multibody simulation based on FE methods and for multiphysics problems.

SAMCEF Field allows you to design your systems with a simple click, using pop-up menus, icon bars, shortcuts or keyboard commands. Design, modeling, analysis and results post-processing operations are driven in a fully contextual and single environment.

GENERAL CHARACTERISTICS

The geometry is either created in the SAMCEF Field modeler or can be directly imported from most commercial CAD software. SAMCEF Field supports a wide range of applications, from simple linear numerical simulations to most advanced dynamic analyses of complex mechatronics systems, based on FEA concept.

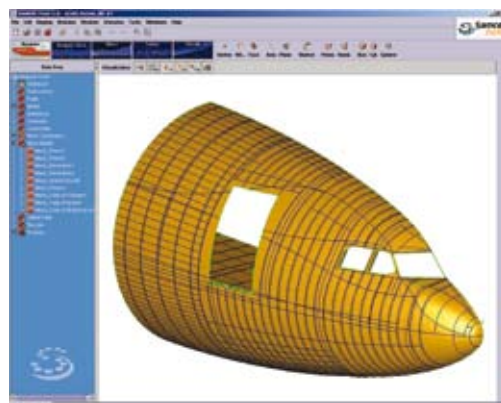
SAMCEF Field integrated reports generation system allows you to make up very comprehensive analysis files in HTML format (modeling and analysis tasks summary, data and properties, photos, list of pre-selected values in Excel format...).

The SAMCEF Field documentation is directly accessible from the graphical interface. The help function offers two research levels depending on the requested information details: tutorial and user manual.

Make analysis an integral part of your design process

USER INTERFACE AND GENERAL FEATURES

- Pull-down menus and toolbars;
- Contextual menus and dialog boxes;
- Navigational system structured in directories;
- Possibility to create "user" sub-directories for an optimized management of the model;
- Interactive graphical manipulation;
- Model building history recorded in the navigational system;
- User preference management for units and symbols. It is now possible to create a model using any coherent units system;
- Management of groups of homogeneous entities;
- Graphical processing of results from SAMCEF and other commercial solvers;
- Automatic generation of customizable HTML analysis report;
- Help and documentation on-line.



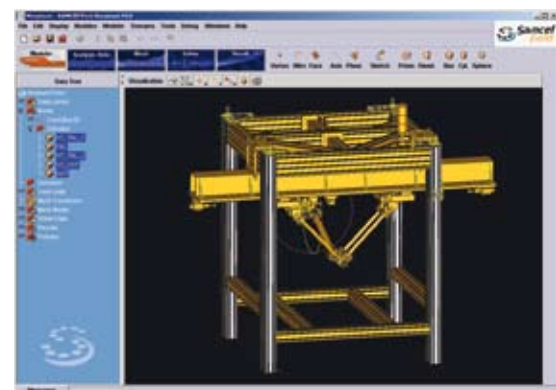
CREATION OF CAD GEOMETRIES

SAMCEF Field integrates simulation in the design process. It includes 2D and 3D design tools making it easy to create simple parts or complex mechanical systems in a very intuitive way, but also to repair or rework imported geometries.

SAMCEF Field also includes a sketcher for the creation of basic geometries (lineic, surfacic, volumic). Lastly, a set of specific tools is available for the assembling of existing geometries.

The complete history of your analysis is directly accessible via the navigational system. Easy-to-use and user-friendly, this feature make it possible to re-use either all or parts of your geometries components or assemblies, or to introduce modifications, immediately passed on to your geometry.

To design or complete a CAD Geometry automatic correction tools



GEOMETRICAL MODELER

- Lineic, surfacic and volumic geometries hierarchical modeler;
- Sketcher to create 2D models with geometrical constraints;
- Geometry parameterization and visualization of parameterized entities;
- Direct import of CATIA V5 & CATIA V4 models;
- Import and export of standard STEP, BREP and IGES formats;
- Assessment of model quality;
- Geometry correction tools: faces sewing, holes filling, treatment of micro-curves, design detail deletion;
- Boolean operations on geometrical entities;
- Assembling of non-manifold geometries;
- Footprints;
- Numerous measuring tools: angles, distances, coordinates...

DATA MANAGEMENT

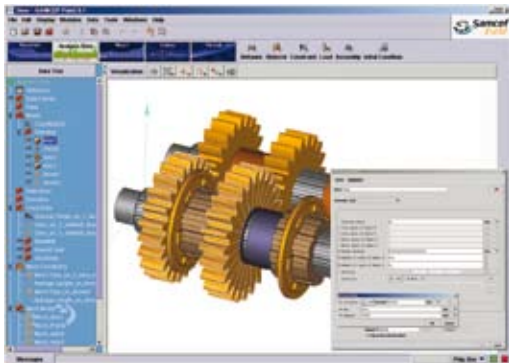
This analysis process step lets you introduce and define all material and physical data of your mechanical system (material behavior, shell thicknesses, beam or rod properties...), as well as boundary conditions, loads and constraints between parts of the system (i.e. local stiffness, springs, gaps).

Data definition uses the mechanical engineer vocabulary. You can thus really focus on your problem, particularly since access is only given to data relevant to the selected application and analysis type. When changes are made to the geometry, all related items are easily updated. You can also assign data directly on the FE mesh.

SAMCEF Field provides you with intuitive tools for data definition and pre-visualization, as well as import and use of existing data libraries.

Initially introduced in the particular context of Super Element creation and utilization, the notion of "Part" has now been extended to general models including geometry, mesh and analysis data. Any SAMCEF Field file can now be imported as a "Part" in order to be connected to other entities and to create a more complex model.

Reliability and quality of your analysis data definition on the geometry



ANALYSIS DATA

- Assignment of the analysis data to the geometry or the F.E. mesh;
- Linear and non-linear isotropic and orthotropic materials (elastoplastic, viscoelastic, hyperelastic...) for thermo-mechanical analysis;
- Thin and thick multilayered shell for composite laminated structures (plies and laminated creation, polar diagrams of equivalent stiffness properties) in the "Composite Viewer";
- Physical data for volume, shell, membrane, beam and rod elements;
- Flexible or rigid behavior;
- Mass & inertial moments in rigid behavior;
- Time dependent loads and boundary conditions;
- Kinematical joints library (cylindric, prismatic, spherical joints; rigid connections, hinges, sliders, gears...);
- Automatic units conversion in coherent system;
- Creation or importation of data libraries;
- Super Element management;
- Automatic update after edition of the geometry.

MESHERS

Within SAMCEF Field, it is only when launching the solver that data are really assigned to the geometry. This characteristic is essential since it allows in particular to easily re-mesh the model, while preserving a coherent data definition.

It is also possible to directly import a mesh either in SAMCEF, NASTRAN, IDEAS or ANSYS formats.

Meshing functionalities in SAMCEF Field are organized in four principal steps :

- Definition of mesh constraint (number of elements on a line, element size...);
- Choice of element order (linear, quadratic...) and meshing type (projection, extrusion, ruled mesh, free mesh...);
- Mesh generation;
- Mesh verification according to integrated quality criteria and possible mesh modification.

The free tetrahedral mesher can operate either on a solid geometry or by filling in an existing skin mesh.

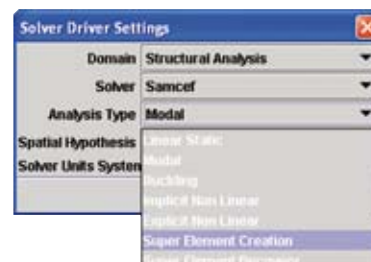
The hexaedric mesher can create meshes by extrusion, revolution or projection of a reference face. The user can then obtain very regular volumic meshes.

The check functions of a mesh allow to locate the areas where the mesh quality has been damaged. While editing elements, they can be corrected: i.e. by node fusion, by relocating nodes...

From fast simple simulations to most complex analyses

GRID

- Possibility to impose global or local mesh constraints;
- Lineic meshers for rod and beam models;
- Triangular and quadrangular surfacic meshers;
- Trans-patch meshing;
- Free tetrahedral mesher;
- Hexahedric and pentahedric meshers with prismatic solids;
- Rigid body mesher;
- Generation of cells with curved or straight edges;
- Sticking between different meshes;
- Graphic checking of mesh quality using topological criteria (user management);
- Detection of free edges and filling up of holes;
- Merging of neighboring nodes;
- Automatic correction of cells violating selected topological criteria;
- Interactive relocation of nodes and cells recombination;
- Mesh orientation visualization;
- Import of SAMCEF, NASTRAN, ANSYS and IDEAS formatted meshes.



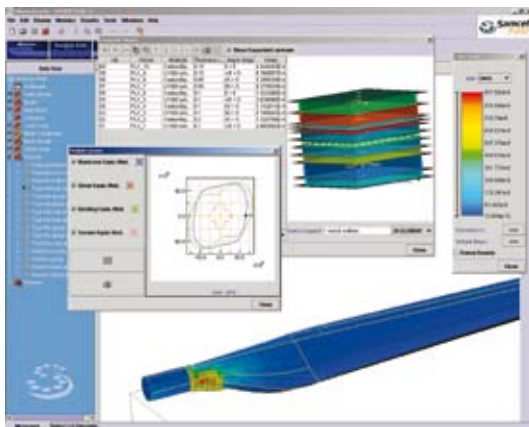
SOLVERS

Before launching the solver, and in order to avoid any waste of time, a data coherence checking is performed. This functionality verifies that the analysis is relevant and that elementary data are not missing. If data are missing, you are immediately informed.

You can select the results to store for the post-processing. By default, you can access standard SAMCEF analysis result.

The monitoring interactive window allows to follow up the evolution of the calculation steps and interrupt if a problem is detected.

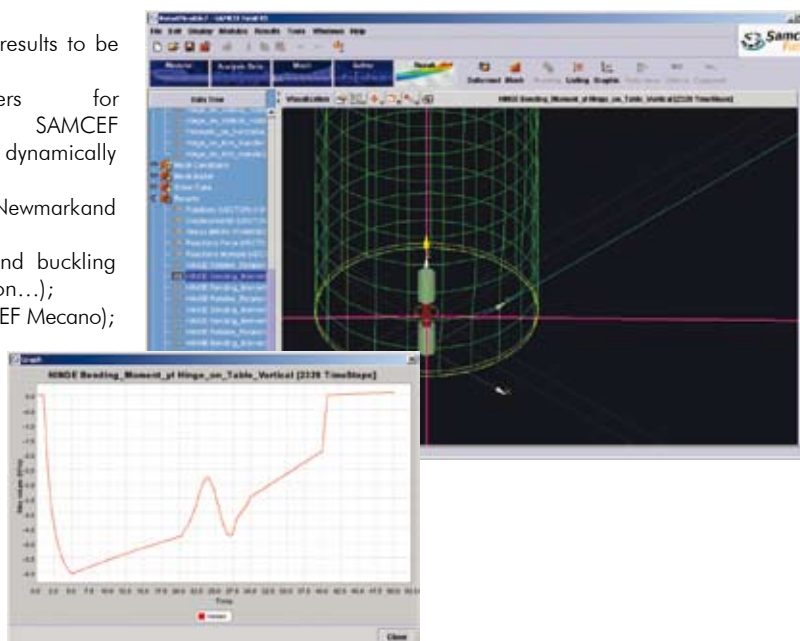
Integrated calculation in the



design and simulation processus

CALCULATION

- Analysis and meshing data check before calculation;
- Choice of the analysis results to be saved;
- Specific parameters for non-linear analyses (they can be dynamically modified);
- Timesteps parameters for Newmark and HHT algorithms;
- Linear solvers (Static and buckling analysis, modal extraction...);
- Non-linear solver (SAMCEF Mecano);
- Multiphysics solvers (OOFELIE VibroAcoustics, OOFELIE PiezoElectric);
- Rotor dynamics: calculation of critical speed, stability, transient and harmonic responses (SAMCEF for Rotors);
- External solvers.



RESULTS ANALYSIS

After analysis completion, the results are easily accessible from a simple click in the navigator.

Standard graphical tools can be used to visualize 2D or 3D analysis results on the initial or deformed geometry (using iso-contour, color maps, symbols, principal tensors...). Result post-processing can be performed on the global model or on selected critical areas.

Results can also be exported into EXCEL sheets.

Lastly, specific functionalities allow to scan any results distribution in 2D or 3D structures and save visualizations as images or video films.

Curves, animations, automatic reports: powerful tools to communicate efficiently on your results to your direction

RESULTS

- Direct access to results through the data tree;
- Visualization in shaded formats with different levels of realistic renderings;
- Iso-surfaces;
- X-Y plots;
- Display on the entire model or on local parts;
- Result listing for the selected nodes or elements and possible export into EXCEL sheets;
- Internal results in mechanical joints for multibody systems;
- Local stress/strain results per ply in laminated structures using the "Composite Viewer";
- Generation of images (.png) and animations (.avi) files.

COUPLING SAMCEF FIELD WITH OTHER PRODUCTS OF SAMCEF & OOFELIE FAMILIES

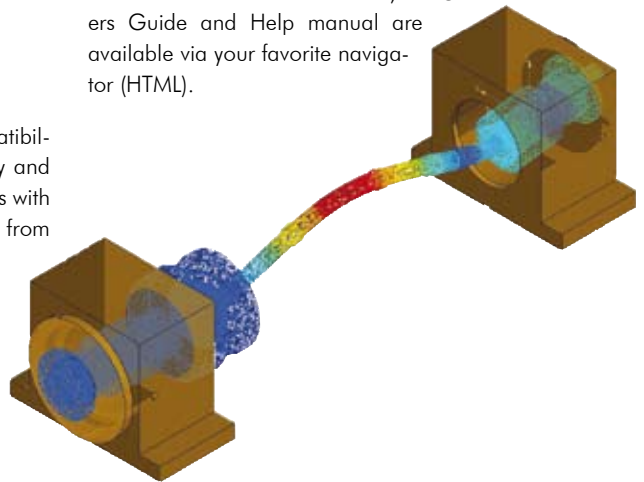
SAMCEF Field environment ensures a total compatibility between different solvers of the SAMCEF family and makes it possible to chain different types of analyses with great flexibility; for example, you can easily switch from linear to non-linear analysis on the same model.

It is also possible to perform a modal analysis or a linear buckling analysis starting from a converged non-linear solution (SAMCEF Mecano).

- SAMCEF Linear (Asef, Dynam, Stabi): linear static, modal and buckling analyses;
- SAMCEF Mecano: unique integrated solver for non-linear structural analysis and multibody systems simulation based on FE methods. SAMCEF Mecano is declined in following modules:
 - MECANO Structure: non-linear structural analysis module, including advanced 2D and 3D friction contact algorithms;
 - MECANO Motion: static, dynamic and kinematical analyses of flexible mechanisms.
- SAMCEF Thermal: stationary thermal analyses;
- SAMCEF for Rotors: critical speed, stability, transient and harmonic responses of rotating systems;
- OOFELIE VibroAcoustics: modal analysis and harmonic response of vibroacoustics systems;
- OOFELIE PiezoElectric: static, modal, harmonic and transient analyses of piezoelectric systems.

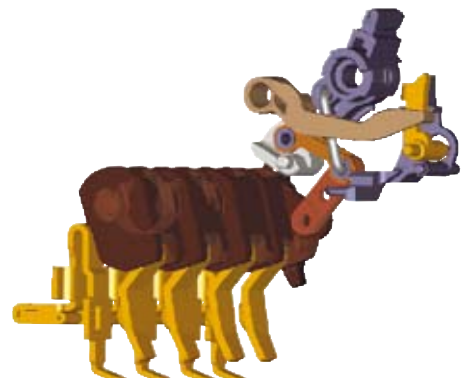
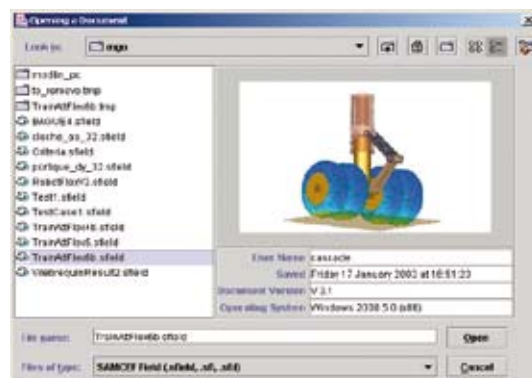
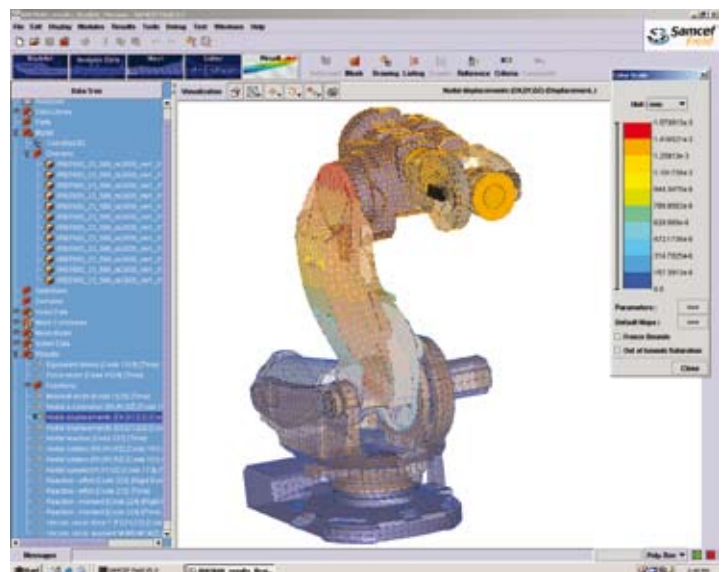
DOCUMENTATION

For direct access to information, the Users Guide and Help manual are available via your favorite navigator (HTML).



PLATFORMS

SAMCEF Field is available on Windows 2000 & XP Pro platforms.



About SAMTECH

Founded in 1986, SAMTECH is now the European leading provider of scientific analysis/optimization software (FEA, MBS, MDO), professional solutions and associated services. SAMTECH develops and commercializes:

"General-purpose software tools": this SAMTECH offer includes the general linear and implicit non-linear Finite Element Analysis package SAMCEF with the CAD/CAE modeling environment FIELD, the general explicit and fast dynamics code EUROPLEXUS; the task management and optimization platform BOSS quattro; TEA Mecano and TEA Thermal CAA V5 Based as non-linear thermo-mechanical solution embedded in CATIA V5 and SAMCEF Gateway CAA V5 Based, the SAMCEF integrated interface within CATIA V5.

"Professional solutions": this SAMTECH offer is based on its general-purpose software tools and is dedicated to specific domains of application like rotor dynamics, modeling of composite structures, mechatronic modeling of machine tools, mechatronic of wind turbines, modeling of transmissions, modeling of large deployable or inflatable structures, modeling of pipes for automotive industry...

"Third party and customized solutions" like the SAFE tool (fatigue analysis of aeronautic structures) and the Application COMPOSITES (analysis of aeronautical composite materials structures) from AIRBUS, where SAMTECH provides its clients with services such as development, reengineering, packaging and deployment of proprietary professional solutions on the customer site.

"Customized multi-physics solutions", based on OOFELIE. OOFELIE is commercialized by OPEN Engineering, the SAMTECH subsidiary, that allows SAMTECH to be present on the multi-physics design markets and to provide services for the development of original highly coupled analysis solutions covering specific needs.

Visit www.samcef.com for further details on SAMTECH Product/Service offer!

Some References

Aerospace

AERMACCHI, AIRBUS, AIR LIQUIDE, ALENIA AERONAUTICA, ALENIA SPAZIO, ASC, AVIO, BOEING HELICOPTER, BOMBARDIER AEROSPACE, CRYOSPACE, EADS-ST, ESA/ESTEC, EUROCOPTER, HUREL HISPANO, LATECOÈRE, MESSIER DOWTY, MTU, SABCA, SAGEM, SNECMA-DMS, SNECMA Moteurs, SONACA, TECHSPACE AERO...

Transport

ADTRANZ, DAIMLER-CHRYSLER, DELPHI AUTOMOTIVE SYSTEMS, LOHR, PORSCHE, PSA, RENAULT, RENAULT SPORT, TUC RAIL...

Energy

ABB, AREVA, EDF, ENEL, GE ENERGY PRODUCT, RTE, SCHNEIDER...

Mechanics

APAVES, COMAU Systèmes France, GLAVERBEL, MAK, PICANOL, SAINT GOBAIN, SOLLAC...

Defence

CEAT, CEPR, CEVAP, DCN, DGA, GIAT INDUSTRIES, GROUPE HERSTAL, MBDA, RHEINMETALL AG...

Research Centers

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